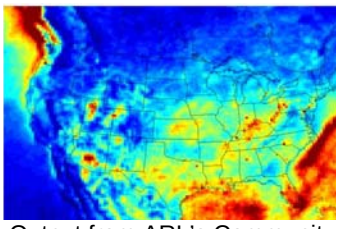
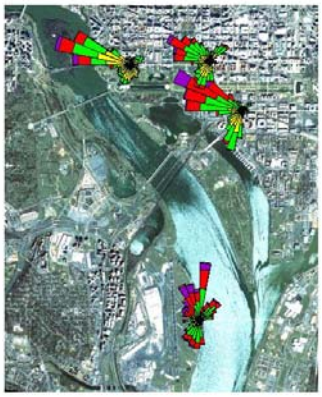
Air Resources Laboratory

The air as part of the total environment



Output from ARL's Community Air Quality Model (CMAQ) showing the likely pattern of annual atmospheric mercury deposition to the surface. Note areas of exceedingly high deposition (in red).

A "Best Available Technology" turbulence probe being fitted to a NOAA aircraft for hurricane research.



Meteorological towers deployed across Washington, DC, serve as a first phase of an evolving urban atmospheric research program. The resulting wind roses offer convincing proof of the large differences between wind patterns over downtown Washington and the Reagan National Airport, to the south.

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What does the Air Resources Laboratory do for the nation?

The Air Resources Laboratory (ARL) studies processes influencing air quality and climate, and develops relevant models. In this research, the air is seen as a resource at risk, potentially affecting other parts of the total environment (including people). ARL emphasizes interpreting data and developing and applying technologies concerning climate and the transport, dispersion, transformation and removal of atmospheric trace gases and aerosols. ARL research is aligned with the three thematic areas of NOAA Research (weather and air quality, climate, and ecosystems), placing a growing focus on issues related to national security. The specific goal of ARL research is to improve and eventually institutionalize the prediction of air quality, plume dispersion, atmospheric deposition, and related variables. ARL operates with research divisions in Silver Spring, Maryland; Idaho Falls, Idaho; Research Triangle Park, North Carolina; Las Vegas, Nevada; and Oak Ridge, Tennessee.

Recent Accomplishments:

- Provided a new generation of air quality models for use in regulatory programs and for exploring control options. **Payoffs: The MODELS-3 air quality model was delivered to the air quality community, a result of collaboration with the Environmental Protection Agency.**

- Developed and delivered a streamlined air quality model now coupled with the weather forecasting models of the National Centers for Environmental Prediction, to provide the integrated model system for operational air quality forecasting. **Payoffs: The ARL system provides a level of air quality forecasting not previously possible.**

- Improved and deployed modern, high-tech systems for measuring the rate of exchange of trace substances between the air and the surface. The surface tower Relaxed Eddy Accumulation methodology was developed and used in first-ever studies of the air-surface exchange of trace mercury compounds. ARL-developed systems were fitted to numerous aircraft for research studies of spatial distributions of air-surface exchange. **Payoffs: The "Best Available Technology" turbulence probe is now a widely accepted tool used by scientists worldwide in studies of how the air and the surface interact. The instrumentation is now installed on the NOAA P-3 aircraft and the commercially-available Sky Arrow.**

- Conducted the first field investigations of the dispersion of atmospheric tracers in New York City and Washington, DC, based on the detection of trace gases emitted from industrial sources. **Payoffs: The first probability distributions for use in forecasting street-level exposure levels have been derived.**

- Provided dispersion-forecasting systems that are coupled with the weather forecast products of the National Weather Service, making use of local tower data and providing easy access by emergency managers. **Payoffs: The Realtime Environmental Applications and Display System (READY) is now a widely used NOAA product, available through ARL (see http://www.arl.noaa.gov/READY).**